#### **Analytical Data Package Prepared For**

# **Pacific Northwest National Lab**

Radiochemical Analysis By

# **STL Richland STLRL**

2800 G.W. Way, Richland Wa, 99354, (509)-375-3131.

Data Package Contains \_\_\_\_\_ Pages

Report Nbr: 34695

SDG Nbr	ORDER Nbr	CLIENT ID NUMBER	LOT Nbr	WORK ORDER	RPT DB ID	BATCH
W05098	106-054	B1K561	J7A190144-1	JM3TT1AA	9JM3TT10	7033223
		B1K561	J7A190144-1	JM3TT1AC	9JM3TT10	7033220
		B1K561	J7A190144-1	JM3TT1AD	9JM3TT10	7033225
		B1K5C9	J7A220122-1	JM6GL1AA	9JM6GL10	7033225



#### STL Richland

2800 George Washington Way Richland, WA 99354

Tel: 509 375 3131 Fax: 509 375 5590

www.stl-inc.com

# **Certificate of Analysis**

Pacific Northwest National Laboratories Sigma V Building Richland, WA 99352

March 16, 2007

Attention: Dot Stewart

SAF Number

106-054

Date SDG Closed

February 1, 2007

Number of Samples

Two (2)

Sample Type

Water

SDG Number Data Deliverable W05098

45-Day / Summary

## **CASE NARRATIVE**

#### I. Introduction

Between January 18, 2007 and January 19, 2007, two water samples were received at STL Richland (STLR) for radiochemical analysis. Upon receipt, the samples were assigned the following laboratory ID numbers to correspond with the Pacific Northwest National Laboratories (PGW) specific IDs:

PGW ID#	STLR ID#	<u>MATRIX</u>	DATE OF RECEIPT
B1K561	JM3TT	WATER	1/18/07
B1K5C9	JM6GL	WATER	1/19/07

#### II. Sample Receipt

The samples were received in good condition and no anomalies were noted during check-in.

#### III. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information, analytical results and the appropriate associated statistical errors.

The requested analyses were:

Gamma Spectroscopy
Iodine-129 (LL) by method RICH-RC-5025
Liquid Scintillation Counting
Technetium-99 by TEVA method RICH-RC-5065
Laser Induced Phosphorimetry
Total Uranium by method RICH-RC-5058

#### IV. Quality Control

The analytical results for each analysis performed includes a minimum of one laboratory control sample (LCS), one method (reagent) blank, and one duplicate sample analysis. Any exceptions have been noted in the "Comments" section.

QC and sample results are reported in the same units.

#### V. Comments

#### **Gamma Spectroscopy**

Iodine-129 (LL) by method RICH-RC-5025:

The LCS, batch blank, samples and sample duplicate (B1K561) results are within contractual requirements.

#### **Liquid Scintillation Counting**

Technetium-99 by TEVA method RICH-RC-5065:

The LCS, batch blank, samples, sample duplicate (B1K561), and sample matrix spike (B1K561) results are within contractual requirements.

#### **Total Uranium**

Total Uranium by method RICH-RC-5058:

The LCS, batch blank, samples, sample duplicate (B1K5C9), and sample matrix spike (B1K5C9) results are within contractual requirements.

I certify that this Certificate of Analysis is in compliance with the SOW, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager, or a designee as verified by the following signature.

Reviewed and approved:

Sherry A. Adam Project Manager

#### **Drinking Water Method Cross References**

	DRINKING WATE	ER ASTM METHOD CROSS REFERENCES
Referenced Method	Isotope(s)	STL Richland's SOP number
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr89/90	RICH-RC-5006
ASTM D2460	Total Radium	RICH-RC-5027
Standard Method 7500-U-C & ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007
NOTE:		
The Gross Alpha LCS is prepared with Am-24		
The Gross Beta LCS is prepared with Sr/Y-90	(unless otherwise	e specified in the case narrative)

#### **Uncertainty Estimation**

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants \* f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties  $(u_i)$  are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty  $(u_c)$  multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/vn), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

**Report Definitions** 

**Action Lev** An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit. The OC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed Batch together. Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30. Bias COC No Chain of Custody Number assigned by the Client or STL Richland. Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same Count Error (#s) units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background. All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure Total Uncert (#s) of the uncertainty associated with the result, u<sub>c</sub> the combined uncertainty. The uncertainty is absolute and in the  $u_c$  - Combined same units as the result. Uncertainty. The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations. (#s), Coverage Factor Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" CRDL (RL) nominal detection limit. Often referred to the reporting level (RL) Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume Lc associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 \*  $Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin))*(ConvFct/(Eff*Yld*Abn*Vol)*IngrFct). \ \ For \ LSC \ methods \ the \ \ ConvFct/(Eff*Yld*Abn*Vol)*(ConvFct/(Eff*Y$ batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero. The number assigned by the LIMS software to track samples received on the same day for a given client. The Lot-Sample No sample number is a sequential number assigned to each sample in the Lot. Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume MDC|MDA with a Type I and II error probability of approximately 5%. MDC = (4.65 \*Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) \* (ConvFct/(Eff \* Yld \* Abn \* Vol) \* lngrFct). For LSC methods the batch blank is used as a measure of the background variability. **Primary Detector** The instrument identifier associated with the analysis of the sample aliquot. The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is Ratio U-234/U-238 1.038. Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of Rst/MDC confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. Rst/TotUcert Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result. Sample Identifier used by the report system. The number is based upon the first five digits of the Work Order Report DB No Number. The equation Replicate Error Ratio =  $(S-D)/[sqrt(TPUs^2 + TPUd^2)]$  as defined by ICPT BOA where S is the original RER sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample. SDG Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt. Sum Rpt Alpha The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where Spec Rst(s) the results are in the same units. Work Order The LIMS software assign test specific identifier. The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method. Yield

3/16/2007 10:32:47 AM STL Richland Report Lab Code: STLRL

FormNbi	r: R	FormatType:	FEAD <b>Versi</b>	i <b>on:</b> 05	Rpt N	<b>br:</b> 34695		File Name: h	::\Reportdb\e	edd\FeadIV\Rad\W050	98.Edd, h:\Rep	ortdb\edd	d\FeadIV\Rad\34695.E	Edd
Lab Sample Id: 9JM3TT10	Client Id: B1K561	Test User	Contract Nbr MW6-SBB-A1	<b>SAF Nb</b>	r <b>Sdg</b> <b>Nbr:</b> W05098	QC Type		Moisture/ Solids%*:	Distilled Volume	Sample On Date:		D	ection Pate: 007 11:25	
Batch	Analyte	CAS#	Result	Unit	CntU 2S	TotU 2S	Qua	al MDA	TrcYield	Method	Alq Size	Unit	Analy Date/Time	Act
7033223	I-129L	15046-84-1	-6.81E <b>-</b> 03	pCi/L	1.5E-01	1.5E-01	U	2.77E-01	95.9	I129LL_SEP_LEPS	3.8751E+00	L	02/21/2007 19:59	1
7033220	TC-99	14133-76-7	1.82E+01	pCi/L	4.6E+00	7.0E+00		9.54E+00	100.0	TC99_ETVDSK_LS	1.257E-01	L	02/06/2007 04:51	1
7033225	Uranium	7440-61-1	9.41E-01	ug/L	9.6E-02	9.6E-02		8.38E-02		UTOT_KPA	2.50E-02	ML	02/28/2007 13:57	' 1
Lab Sample Id: 9JM6GL10	Client Id: B1K5C9	Test User	Contract Nbr MW6-SBB-A1	<b>SAF Nb</b>	r <b>Sdg</b> <b>Nbr:</b> W05098	QC Typ		Moisture/ Solids%*:	Distilled Volume				ection Date: 007 09:07	
Batch	Analyte	CAS#	Result	Unit	CntU 2S	TotU 2S	Qua		TrcYield	Method	Alq Size	Unit	Analy Date/Time	Act
7033225	Uranium	7440-61-1	1.10E+01	ug/L	1.3E+00	1.3E+00		8.35E-02		UTOT_KPA	2.51E-02	ML	02/28/2007 14:00	)

J Qual - No U qualifier has been assigned and the result is below the Reporting Limit (CRDL).

B Qual- Analyte was found in the associated laboratory blank above the MDC.

Friday, March 16, 2007 STL Richland QC Blank Report Lab Code: STLRL FormNbr: R FormatType: FEAD VersionNbr: 05 File Name: h:\Reportdb\edd\FeadIV\Rad\W05098.Edd, h:\Reportdb\edd\FeadIV\Rad\34695.Edd JNTV41AB Sdg/Rept Nbr: W05098 Collection Date: 01/18/2007 11:25 Lab Sample Id: 34695 Client Id: NA WATER Matrix: **WATER** Sample On Date: Moisture/Solids%\*: QC Type: **BLK** Received Date: 01/18/2007 SAF Nbr Contract Nbr **Test User** Case Nbr SAS Nbr Suffix **Distilled Volume** Decant File Id FSuffix RTyp MW6-SBB-A19981 ΑН Η Batch # / Analyt/ Result/ Tot/Cnt Qu-Tracer Spk Conc/ Analy Aliq Date/Time RPD/ RER/ LCS R LCL/UCL Typ CAS# Orig Rst **Uncert 2S** MDC Yield %Rec Method Qc Type Unit al Size/ Analyzed UCL UCL TC-99 pCi/L 5.9E+00 9.38E+00 100.0 7033220 2.78E+00 U TC99 ETVDSK 1.287E-01 02/06/2007 D

L

04:51

BLK

14133-76-7

4.0E+00

STL Richland QC Blank Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W05098.Edd, h:\Reportdb\edd\FeadIV\Rad\34695.Edd

Lab Sample Id:

JNTV71AB

Sdg/Rept Nbr: W05098

Collection Date: 01/18/2007 11:25

Client Id:

NA

Matrix:

**WATER** 

34695 **WATER** 

Sample On Date:

Moisture/Solids%\*:

Analyt/

QC Type:

**BLK** 

**Received Date:** 01/18/2007

SAF Nbr

Contract Nbr

Case Nbr

SAS Nbr

Suffix Decant **Distilled Volume** 

File Id

FSuffix RTyp ΑJ

Η

R

MW6-SBB-A19981

Result/

Tot/Cnt Uncert 2S

**Test User** 

Qual MDC

Tracer Yield

Spk Conc/ %Rec

Analy Method

Aliq Size/

Date/Time Analyzed

RPD/ RER/ UCL

LCS

Qc Type 7033223 I-129L

Batch # /

CAS# **Orig Rst** 3.41E-02 15046-84-1

pCi/L 1.1E-01

Unit

1.1E-01

2.19E-01 101.1 1129LL SEP L 3.9501E+00 02/21/2007

LCL/UCL Typ UCL

D

BLK

20:03

STL Richland

rptFeadRadEdd v3.68

U Qual - Analyzed for, but the result is less than the Mdc or gamma scan did not identify the nuclide. J Qual - No U qualifier has been assigned and the result is below the Reporting Limit (CRDL).

B Qual- Analyte was found in the associated laboratory blank above the MDC.

Lab Code: STLRL Friday, March 16, 2007 STL Richland QC Blank Report

FormNbr: R FormatType: FEAD VersionNbr: 05 File Name: h:\Reportdb\edd\FeadIV\Rad\V\05098.Edd, h:\Reportdb\edd\FeadIV\Rad\V\84695.Edd

Sdg/Rept Nbr: W05098 Lab Sample Id: JNTWC1AB 34695 Collection Date: 01/19/2007 09:07

WATER WATER Sample On Date: Client Id: NA Matrix:

QC Type: Moisture/Solids%\*: **BLK** Received Date: 01/19/2007

**Distilled Volume** SAF Nbr Contract Nbr **Test User** Case Nbr SAS Nbr Suffix Decant File Id FSuffix RTyp MW6-SBB-A19981 ΑL Н LCS R Batch # / Analyt/ Result/ Tot/Cnt Qu-Tracer Spk Conc/ Analy Aliq Date/Time RPD/ RER/ Qc Type CAS# Orig Rst Unit Uncert 2S al MDC Yield %Rec Method Size/ Analyzed UCL UCL LCL/UCL Typ 0.0E+00 2.10E-01 UTOT\_KPA 2.51E-02 02/28/2007 D 7033225 Uranium 0.00E+00 ug/L ML 0.0E+00 13:49

BLK

7440-61-1

3

#### STL Richland QC Control Sample Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W05098.Edd, h:\Reportdb\edd\FeadIV\Rad\34695.Edd

Lab Sample Id:

JNTV41CS

Sdg/Rept Nbr: W05098

34695

**Collection Date:** 01/18/2007 11:25

Client Id:

NA

WATER

Sample On Date:

Matrix:

WATER

Moisture/Solids%\*:

QC Type:

BS

**Received Date:** 

01/18/2007

SAF		ntract Nbr S-SBB-A19981	1	est User	Case	Nbr S/	AS Nbr	Suffix	Decant [	Distilled Volume	File	e Id		FSuffix I Al	н Н
Batch # / Qc Type	Analyt/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu- al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UC	R L Typ
7033220	TC-99	5.00E+02	pCi/L	3.9E+01		9.34E+00	100.0	5.22E+02	TC99_ETVDSk	( 1.285E-01	02/06/2007			70	D
BS	14133-76-7			1.3E+01				95.7		L	04:51			130	

Friday, March 16, 2007 STL Richland QC Control Sample Report Lab Code: STLRL

FormNbr: R FormatType: FEAD VersionNbr: 05 File Name: h:\Reportdb\edd\Fead\IV\Rad\W05098.Edd, h:\Reportdb\edd\Fead\IV\Rad\W05098.Edd, h:\Reportdb\edd\Fead\IV\Rad\W05098.Edd

**Lab Sample Id:** JNTV71CS **Sdg/Rept Nbr:** W05098 34695 **Collection Date:** 01/18/2007 11:25

Client Id: NA Matrix: WATER WATER Sample On Date:

Moisture/Solids%\*: QC Type: BS Received Date: 01/18/2007

SAF		ontract Nbr 6-SBB-A19981	T	Test User	Case	Nbr S	AS Nbr	Suffix	Decant	Distilled Volume	File	e ld		FSuffix AK	RTyp H
Batch # / Qc Type	Analyt/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu- al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/U	R CL Typ
7033223	I-129L	8.01E+00	pCi/L	1.1E+00		3.42E-01	94.8	1.02E+01	I129LL_SEP_	L 3.7701E+00	02/21/2007			70	D
BS	15046-84-1			1.1E+00				78.4		L	21:54			130	

5

# STL Richland QC Control Sample Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W05098.Edd, h:\Reportdb\edd\FeadIV\Rad\34695.Edd

Lab Sample Id:

JNTWC1CS

Sdg/Rept Nbr: W05098

34695

**Collection Date:** 01/19/2007 09:07

Client Id:

NA

Matrix:

**WATER** 

**WATER** 

Sample On Date:

Moisture/Solids%\*:

QC Type: BS

**Received Date:** 

01/19/2007

SAF		ontract Nbr 6-SBB-A19981	T	est User	Case	Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File	e ld		FSuffix F AM	<b>RТур</b> Н
Batch # / Qc Type	Analyt/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu- al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UC	R L Typ
7033225 <b>BS</b>	Uranium 7440-61-1	3.41E+01	ug/L	4.1E+00 4.1E+00		8.35E-0	2	3.59E+01 94.9	UTOT_KPA	2.51E-02 ML	02/28/2007 13:53			70 130	D

## STL Richland QC Control Sample Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W05098.Edd, h:\Reportdb\edd\FeadIV\Rad\34695.Edd

Lab Sample Id:

JNTWC1DS

Sdg/Rept Nbr: W05098

34695

Collection Date: 01/19/2007 09:07

Client Id:

NA

Matrix:

**WATER** BS

WATER

Sample On Date:

Moisture/Solids%\*:

QC Type:

**Received Date:** 

01/19/2007

SAF		ontract Nbr 6-SBB-A19981	Т	est User	Case	Nbr	SAS Nbr	Suffix	Decant	Distilled Volume	File	: ld		FSuffix F AN	RTyp ⊣
Batch # / Qc Type	Analyt/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu- al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UC	R L Typ
7033225 <b>BS</b>	Uranium 7440-61-1	3.72E+00	ug/L	3.8E-01 3.8E-01		8.28E-0	02	3.60E+00 103.3	UTOT_KPA	2.53E-02 ML	02/28/2007 13:55			70 130	D

### STL Richland QC Duplicate Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W05098.Edd, h:\Reportdb\edd\FeadIV\Rad\34695.Edd

Collection Date: 01/18/2007 11:25

Lab Sample Id:

JM3TT1ER

Sdg/Rept Nbr: W05098

34695

Client Id:

B1K561

Matrix:

WATER

Sample On Date:

Moisture/Solids%\*:

QC Type:

Received Date:

01/18/2007

SAF Nbr

Contract Nbr

Case Nbr

**DUP** 

WATER

Suffix

Distilled Volume

106-054

Qu-

SAS Nbr

Decant

File Id

FSuffix RTyp AC

Н

D

R

MW6-SBB-A19981

Tracer

Spk Conc/ %Rec

Analy

Aliq Size/

Date/Time Analyzed

RPD/ UCL LCS

Batch # / Qc Type 7033220

Analyt/ CAS# TC-99

Result/ Orig Rst 1.85E+01

Unit Uncert 2S pCi/L 7.1E+00 4.7E+00

**Test User** 

al MDC Yield 1.01E+01

Method TC99\_ETVDSK 1.254E-01

02/06/2007

UCL 0.1 1.5 20.0

LCL/UCL Typ

DUP 14133-76-7

1.82E+01

Tot/Cnt

100.0

04:51

3

RER/

# STL Richland QC Duplicate Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W05098.Edd, h:\Reportdb\edd\FeadIV\Rad\34695.Edd

Lab Sample Id:

JM3TT1FR

Sdg/Rept Nbr: W05098

34695

Collection Date: 01/18/2007 11:25

Client Id:

B1K561

Matrix:

**WATER** 

WATER

Sample On Date:

Received Date:

01/18/2007

Moisture/Solids%\*:

QC Type:

DUP

SAF Nbr 106-054

Contract Nbr MW6-SBB-A19981 Test User

Case Nbr

Qu-

SAS Nbr

Tracer

Yield

99.5

Suffix

Decant

Distilled Volume

File Id

FSuffix RTyp ΑD Η

Batch # / Qc Type 7033223

DUP

Analyt/ CAS# I-129L

15046-84-1

Result/ **Orig Rst** 8.91E-02 -6.81E-03

Tot/Cnt Unit Uncert 2S pCi/L 1.9E-01 1.9E-01

al MDC U 2.51E-01 Spk Conc/ %Rec

Analy Method 1129LL SEP L

Aliq Size/

Date/Time Analyzed 3.8905E+00 02/21/2007 RPD/ UCL UCL 233.1 0.7

RER/

LCS LCL/UCL Typ D

R

20:03 20.0 3

### STL Richland QC Duplicate Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W05098.Edd, h:\Reportdb\edd\FeadIV\Rad\34695.Edd

Lab Sample Id:

JM6GL1DR

Sdg/Rept Nbr: W05098

34695

Collection Date: 01/19/2007 09:07

Client Id:

B1K5C9

Matrix:

WATER

WATER

Sample On Date:

Moisture/Solids%\*:

QC Type:

DUP

Received Date:

01/19/2007

<b>SAF</b> 106-05		ontract Nbr 6-SBB-A19981	Т	est User	Case	Nbr :	SAS Nbr	Suffix	Decant	Distilled Volume	File	e Id		FSuffix R' AG	Тур Н
Batch # / Qc Type	Analyt/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu- al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UCL	R . Typ
7033225 <b>DUP</b>	Uranium 7440-61-1	1.13E+01 1.10E+01	ug/L	1.4E+00 1.4E+00		8.03E-0	2		UTOT_KPA	2.61E-02 ML	02/28/2007 14:04	3.4 20.0	0.4 3		D

## STL Richland Qc Matrix Spike Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

Test Hear

3.2E+01

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\VW05098.Edd, h:\Reportdb\edd\FeadIV\Rad\V\Rad\VA695.Edd

Distilled Volume

Lab Sample Id:

JM3TT1GW

Sdg/Rept Nbr: W05098

34695

Collection Date: 01/18/2007 11:25

Client Id:

B1K561

Matrix:

Case Nhr

**WATER** 

WATER

Sample On Date:

ESuffix RTvn

140

SAENbr

MS

QC Type:

Decant

04:51

Moisture/Solids%\*:

14133-76-7

Contract Nhr

MS

SAS Nhr

Received Date:

01/18/2007

File Id

JAI I	10:	THE BUT INDI	*	CSt OSCI	Casc	110: 07	O INDI	Outlix	Decame	natifica voidific		, IU		i Oumx i	אנייי	
106-054	4 MW6	6-SBB-A19981												ΑE	Н	
Batch # / Qc Type	Analyt/ CAS#	Result/ Orig Rst	Unit	Tot/Cnt Uncert 2S	Qu- al	MDC	Tracer Yield	Spk Conc/ %Rec	Analy Method	Aliq Size/	Date/Time Analyzed	RPD/ UCL	RER/ UCL	LCS LCL/UC	R L Typ	
7033220	TC-99	3.42E+03	pCi/L	2.4E+02		9.62E+00	100.0	3.61E+03	TC99_ETVDS	( 1.248E-01	02/06/2007			60	D	

Suffix

94.8

### STL Richland Qc Matrix Spike Report

Lab Code: STLRL

FormNbr: R

FormatType: FEAD

VersionNbr: 05

File Name: h:\Reportdb\edd\FeadIV\Rad\W05098.Edd, h:\Reportdb\edd\FeadIV\Rad\34695.Edd

Lab Sample Id:

JM6GL1CW

Sdg/Rept Nbr: W05098

34695

Collection Date: 01/19/2007 09:07

Client Id:

B1K5C9

Matrix:

**WATER** 

WATER

Sample On Date:

Moisture/Solids%\*:

7440-61-1

QC Type:

MS

Received Date:

01/19/2007

SAF Nbr 106-054

Contract Nbr MW6-SBB-A19981 Case Nbr

SAS Nbr

Suffix

**Distilled Volume** Decant

File Id

FSuffix RTyp AF

Н

Batch # / Qc Type

7033225

MS

Analyt/ CAS# Uranium

Result/ Orig Rst 3.04E+01

Tot/Cnt Unit Uncert 2S ug/L 5.2E+00 5.2E+00

**Test User** 

Qu-MDC 8.00E-02 Tracer Spk Conc/ Yield %Rec 3.36E+01 90.4

Analy Method UTOT\_KPA

Aliq Size/ 2.62E-02 ML

Analyzed 02/28/2007 14:02

Date/Time

RPD/ RER/ UCL UCL

LCS LCL/UCL Typ

60 D 140



## Data Review/Verification Checklist RADIOCHEMISTRY, First Level Review

2/7/2007 9:08:59 AM

Lot No., Due Date:

J7A190144; 03/05/2007

Client, Site:

384868; PGW 615HANFORD HANFORD

QC Batch No., Method Test: 7033220; RTC99 Tc-99 by LSC SDG, Matrix: W05093; WATER

L Richland AS_RADCALCv4.8.26	Page	1	
No FWHM found in Batch Data!	a er Arazonea ana konsolan errora e-errora	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
24 Result + 3s >=0, Not Too Negative.  OK  25 Counting Spectrum are within FWHM Limits.			N/A
OK; No Callin Level Found => TC-99			
23 Result <= Action Level, when Defined. OK; No Action Level Found => TC-99	Yes	No	N/A
No Positive Results OK Calc_IDL Not Calculated	V		. 17.
21 Result < Lc, Activity Not Detected, U Flag.  No Limit Specified!  22 Result < Mdc, Activity Not Detected, U Flag.	Yes Yes		N/A
2 Comments:			
19 Sample Specific MDC <= CRDL. OK	Yes	No	N/A
18 Samples are above Minimum Tracer Yield (No Failed Samples) No Tracers found in Batch!	Yes	No	N/A
17 Tracer within Control Limits.  No Tracers found in Batch!	Yes	No	N/A
16 MS within Control Limits.  OK	Yes	No	N/A
15 MLCS within Control Limits.  No Matrix Spikes (MLCS) found in Batch!	Yes	No	N/
14 LCS within Control Limits. OK	Yes		
OK (RPD)	Yeş		
OK  13 QAS Specified Duplicate Equation Value within Control Limits.	V		
No Matrix Blanks (MBlks) found in Batch!  12 Method Blank(s) < QAS Limit Value (No B Flag Necessary).	Yeş	No	N/A
11 Matrix Blank is within Control Limits.	Yes	No	Ņ/
OK 1 Comments:	( <b>V</b> )		
OK 09 Method Blank is within Control Limits.	Yeş	No	N/A
OK OR The Sample was Counted for the Minimum Count Time or CRDL was Achieved.	Yes	No	N/A
07 The Correct Count Geometry was Used.	Yeş	No	N/
06 At Least the Minimum Sample Volume Was Used OK	Yeş	No	N/
05 Sample was Appropriately Traced Before or After Fractionating the Sample OK	Yes	Ν̈́ο	N/
04 The Correct Tracer and QC Vials Where Used in the Samples Incorrect Tracer/Vial => JM3TT1AG TCSG<>TCSE Q:V9	Yes	No	N/
03 Batch Contains the Required QC Appropriate for the Method OK	Yes	No	N/
02 Final Results Are in the Appropriate Activity Units  OK	Yes		
01 The Appropriate Methods Were Used To Analyze the Samples OK			
01 The Appropriate Methode Mere Reed to Applyze the Samples	Yeş	No	NI/

8.26	Instruments have Current Calibrations.	Yes	No	N/A
	Correct Count Library Used.  No Count Library found in Batch Data! Instrument Background within Limits at Time of Counting. (Not Applicable to this version. To be developed in later version.	Yes on <b>Y</b> e≽s		V
8.29	Instrument Check Source within Limits at the Time of Counting. (Not Applicable to this version. To be developed in later	<b>∨Yéess</b> io	or <b>iNeò</b> .	N/A
	Comments:			
	Results Blank Subtracted as Appropriate.	Yeş	No	N/A
0.01	OK	V		
				Í
Firs	st Level Review Land anderson Date 2-7.07			
	Richland	Page	2	

QAS\_RADCALCv4.8.26



#### Data Review Checklist RADIOCHEMISTRY Second Level Review

OC Batch Number: 7033 LLD			
OC Batch Number: 7633 LZ U W0 5098			
Review Item	Yes (√)	No (1)	N/A (√)
A. Sample Analysis			
1. Are the sample yields within acceptance criteria?			.
2. Is the sample Minimum Detectable Activity < the Contract			
Detection Limit?			
3. Are the correct isotopes reported?			
B. QC Samples			
1. Is the Minimum Detectable Activity for the blank result ≤ the			
Contract Detection Limit?	-		
2. Does the blank result meet the Contract criteria?			
3. Is the blank result < the Contract Detection Limit?	E. Marie		
4, Is the blank result > the Contract Detection Limit but the sample			
result < the Contract Detection Limit?			processor.
5. Is the LCS recovery with contract acceptance criteria?			
7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection			
Limit?			
8. Do the MS/MSD results and yields meet acceptance criteria?			
9. Do the duplicate sample results and yields meet acceptance			
criteria?	manufacture of the second		
C. Other			
1. Are all Nonconformances included and noted?			
2. Are all required forms filled out?			
3. Was the correct methodology used?			
4. Was transcription checked?			
5. Were all calculations checked at a minimum frequency?			
6. Were units checked?			
Comments on any "No" response:			
		-	•
		,	
Second Level Review Therryl a Adam	and an analysis and a second	Date:	2-7-07



# Data Review/Verification Checklist RADIOCHEMISTRY, First Level Review

2/22/2007 1:24:55 PM

Lot No., Due Date:

J7A190144; 03/05/2007

Client, Site:

384868; PGW 615HANFORD HANFORD

QC Batch No., Method Test: 7033223; RGAMLEPS Gamma by LEPS

SDG, Matrix: W05098; WATER

UD.	WUUUN. WUUUN, WATER			
	COC s the ICOC page complete; includes all applicable analysis, dates, SOP numbers, and revisions?	Yeş	No	N/A
<b> </b>	QC Batch	Ž	140	IVA
	Oo the Summary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet?	Yea	No	N/A
2.2	Are the QC appropriate for the analysis included in the batch?	Yes	No	N/A
2.3	s the Analytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc?	Yes	No	N/A
2.4	Does the Worksheets include a Tracer Vial label for each sample?	Yes	No	N/A
3.0	QC & Samples	<b>'</b>		
	s the blank results, yield, and MDA within contract limits?	Yes	No	N/A
3.2	s the LCS result, yield, and MDA within contract limits?	Yes	No	N/A
3.3	Are the MS/MSD results, yields, and MDA within contract limits?	Yes	No	N/A
3.4	Are the duplicate result, yields, and MDAs within contract limits?	Yes	No	N/A
3.5	Are the sample yields and MDAs within contract limits?	Yes	No	N/A
4.0	Raw Data			
	Were results calculated in the correct units?	Yea	No	N/A
4.2	Were analysis volumes entered correctly?	Yes	No	N/A
1.3	Were Yields entered correctly?	Yes	No	N/A
1.4	Were spectra reviewed/meet contractual requirements?	Yes	No	N/A
1.5	Were raw counts reviewed for anomalies?	Yes	No	N/A
	Other	Talenage Me		
	Are all nonconformances included and noted?	Yes	No	N/A
	Are all required forms filled out?	Yes	No	N/A
	Vas the correct methodology used?	Yes	No	N/A
	Vas transcription checked?	Yes	No	N/A
	Vere all calculations checked at a minimum frequency?	Yes	No	N/A
5.6	Are worksheet entries complete and correct?	Yes	No	N/A
3.0	Comments on any No response:		en rees o ye group.	LESSONALIV MANORA

First Level Review

STL Richland QAS\_RADCALCv4.8.26 Date

2/22/07



# Data Review Checklist RADIOCHEMISTRY Second Level Review

Review Item Yes (V) No (V) N/A (V)  A. Sample Analysis  J. Are the sample yields within acceptance criteria?  2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?  3. Are the correct isotopes reported?  B. QC Samples  1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?  2. Does the blank result meet the Contract criteria?  3. Is the blank result > the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance?  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  Comments on any "No" response:	OC Batch Number: 7033223 W05098			
A. Sample Analysis  1. Are the sample yields within acceptance criteria?  2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?  3. Are the correct isotopes reported?  B. QC Samples  1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?  2. Does the blank result meet the Contract criteria?  3. Is the blank result < the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were units checked?	w05098.			
A. Sample Analysis  1. Are the sample yields within acceptance criteria?  2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?  3. Are the correct isotopes reported?  B. QC Samples  1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?  2. Does the blank result meet the Contract criteria?  3. Is the blank result < the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were units checked?				
A. Sample Analysis  1. Are the sample yields within acceptance criteria?  2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?  3. Are the correct isotopes reported?  B. QC Samples  1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?  2. Does the blank result < the Contract Detection Limit?  4. Is the blank result < the Contract Detection Limit?  5. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were units checked?		Yes (√)	No (V)	N/A (V)
2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?  3. Are the correct isotopes reported?  B. QC Samples 1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?  2. Does the blank result meet the Contract criteria?  3. Is the blank result < the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?			1210 (1)	11/22 (4)
2. Is the sample Minimum Detectable Activity < the Contract Detection Limit?  3. Are the correct isotopes reported?  B. QC Samples 1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?  2. Does the blank result meet the Contract criteria?  3. Is the blank result < the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	1. Are the sample yields within acceptance criteria?			ļ
Detection Limit?  3. Are the correct isotopes reported?  B. QC Samples  1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?  2. Does the blank result meet the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	2. Is the sample Minimum Detectable Activity < the Contract	+		
B. QC Samples  1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit?  2. Does the blank result meet the Contract criteria?  3. Is the blank result < the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	Detection Limit?			
1. Is the Minimum Detectable Activity for the blank result ≤ the Contract Detection Limit? 2. Does the blank result meet the Contract criteria? 3. Is the blank result > the Contract Detection Limit? 4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit? 5. Is the LCS recovery with contract acceptance criteria? 7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit? 8. Do the MS/MSD results and yields meet acceptance criteria? 9. Do the duplicate sample results and yields meet acceptance criteria? C. Other 1. Are all Nonconformances included and noted? 2. Are all required forms filled out? 3. Was the correct methodology used? 4. Was transcription checked? 5. Were all calculations checked at a minimum frequency? 6. Were units checked?	3. Are the correct isotopes reported?			
2. Does the blank result meet the Contract criteria?  3. Is the blank result > the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	B. QC Samples			<del>                                     </del>
2. Does the blank result meet the Contract criteria?  3. Is the blank result > the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	1. Is the Minimum Detectable Activity for the blank result < the			
3. Is the blank result < the Contract Detection Limit?  4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	Contract Detection Limit?			
4. Is the blank result > the Contract Detection Limit but the sample result < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	2. Does the blank result meet the Contract criteria?			
<ul> <li>4. Is the blank result &gt; the Contract Detection Limit but the sample result &lt; the Contract Detection Limit?</li> <li>5. Is the LCS recovery with contract acceptance criteria?</li> <li>7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?</li> <li>8. Do the MS/MSD results and yields meet acceptance criteria?</li> <li>9. Do the duplicate sample results and yields meet acceptance criteria?</li> <li>C. Other</li> <li>1. Are all Nonconformances included and noted?</li> <li>2. Are all required forms filled out?</li> <li>3. Was the correct methodology used?</li> <li>4. Was transcription checked?</li> <li>5. Were all calculations checked at a minimum frequency?</li> <li>6. Were units checked?</li> </ul>	3. Is the blank result < the Contract Detection Limit?		<del>                                     </del>	
sesuit < the Contract Detection Limit?  5. Is the LCS recovery with contract acceptance criteria?  7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	4. Is the blank result > the Contract Detection Limit but the sample			-
<ul> <li>7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?</li> <li>8. Do the MS/MSD results and yields meet acceptance criteria?</li> <li>9. Do the duplicate sample results and yields meet acceptance criteria?</li> <li>C. Other</li> <li>1. Are all Nonconformances included and noted?</li> <li>2. Are all required forms filled out?</li> <li>3. Was the correct methodology used?</li> <li>4. Was transcription checked?</li> <li>5. Were all calculations checked at a minimum frequency?</li> <li>6. Were units checked?</li> </ul>	result < the Contract Detection Limit?			
<ul> <li>7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection Limit?</li> <li>8. Do the MS/MSD results and yields meet acceptance criteria?</li> <li>9. Do the duplicate sample results and yields meet acceptance criteria?</li> <li>C. Other</li> <li>1. Are all Nonconformances included and noted?</li> <li>2. Are all required forms filled out?</li> <li>3. Was the correct methodology used?</li> <li>4. Was transcription checked?</li> <li>5. Were all calculations checked at a minimum frequency?</li> <li>6. Were units checked?</li> </ul>	5. Is the LCS recovery with contract acceptance criteria?		<u> </u>	
Limit?  8. Do the MS/MSD results and yields meet acceptance criteria?  9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	7. Is the LCS Minimum Detectable Activity < the Contract Detection	<del>                                     </del>		
9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	Limit?			
9. Do the duplicate sample results and yields meet acceptance criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	8. Do the MS/MSD results and yields meet acceptance criteria?	<del>                                     </del>		+
criteria?  C. Other  1. Are all Nonconformances included and noted?  2. Are all required forms filled out?  3. Was the correct methodology used?  4. Was transcription checked?  5. Were all calculations checked at a minimum frequency?  6. Were units checked?	9. Do the duplicate sample results and yields meet acceptance		-	+
1. Are all Nonconformances included and noted? 2. Are all required forms filled out? 3. Was the correct methodology used? 4. Was transcription checked? 5. Were all calculations checked at a minimum frequency? 6. Were units checked?	criteria?			
2. Are all required forms filled out? 3. Was the correct methodology used? 4. Was transcription checked? 5. Were all calculations checked at a minimum frequency? 6. Were units checked?	C. Other			<del></del>
2. Are all required forms filled out? 3. Was the correct methodology used? 4. Was transcription checked? 5. Were all calculations checked at a minimum frequency? 6. Were units checked?	1. Are all Nonconformances included and noted?			
4. Was transcription checked? 5. Were all calculations checked at a minimum frequency? 6. Were units checked?				+
4. Was transcription checked? 5. Were all calculations checked at a minimum frequency? 6. Were units checked?	3. Was the correct methodology used?			<del></del>
6. Were units checked?		+		
6. Were units checked?	5. Were all calculations checked at a minimum frequency?	1	<u> </u>	
Comments on any "No" response:	6. Were units checked?	+-/-	<del> </del>	
	·			
	,		,	
		•*		
Second Level Review Review	Second Level Project Color			



# Data Review/Verification Checklist RADIOCHEMISTRY, First Level Review

2/28/2007 4:01:29 PM

Lot No., Due Date:

J7A190144,J7A220122; 03/05/2007

Client, Site:

384868; PGW 615HANFORD HANFORD

QC Batch No., Method Test: 7033225; RUNAT UNat by KPA

SDG, Matrix:

W05098; WATER

		. Woodo, WALK			
	COC Is the ICC	C page complete; includes all applicable analysis, dates, SOP numbers, and revisions?	Yeş	No	N/A
Erlanden	base - l-t-a U el lei lei teno estimento cua succi.		V		147.
<b>2.0</b> 2.1	QC Bate Do the Su	n mmary/Detailed Reports include a calculated result for each sample listed on the QC Batch Sheet?	Yes	No	N/A
2.2	Are the G	C appropriate for the analysis included in the batch?	Yes	No	N/A
2.3	Is the Ana	lytical Batch Worksheet complete; includes as appropriate, volumes, count times, etc?	Yes	No	N/A
2.4	Does the	Worksheets include a Tracer Vial label for each sample?	Yes	No	N/A
3.0	QC & S	mples	•		
		ık results, yield, and MDA within contract limits?	Yes	No	N/A
3.2	Is the LC	result, yield, and MDA within contract limits?	Yes	No	N/A
3.3	Are the N	S/MSD results, yields, and MDA within contract limits?	Yes	No	N/A
3.4	Are the d	plicate result, yields, and MDAs within contract limits?	Yes	No	N/A
3.5	Are the s	mple yields and MDAs within contract limits?	Yes	No	N/A
4.0	Raw Da	a -	•		18.75 miles
4.1	Were res	ilts calculated in the correct units?	Yea	No	N/A
4.2	Were and	lysis volumes entered correctly?	Yes	No	N/A
4.3	Were Yie	ds entered correctly?	Yes	No	N/A
4.4	Were spe	ctra reviewed/meet contractual requirements?	Yes	No	N/A
4.5	Were raw	counts reviewed for anomalies?	Yes	No	N/A
	Other		•		
5.1	Are all no	iconformances included and noted?	Yes	No	NA
5.2	Are all re	uired forms filled out?	Yes	No	N/A
5.3	Was the	orrect methodology used?	Yes	No	N/A
5.4	Was tran:	cription checked?	Yes	No	N/A
5.5	Were all	alculations checked at a minimum frequency?	Yes	No	N/A
5.6	Are works	neet entries complete and correct?	Yes	No	N/A
6.0	Commen	on any No response:			***************************************
. LICENSTRABITES.	такт макейин 400 г. не остановного постанов и бит		eneriio riste considii anglee ster-		ween enroomed 4-d2-acro
	st Level i	Review Ram anderson Date 3-14-07		_	
	Richland _RADCAL(	v4.8.26	Page	1	



# Data Review Checklist RADIOCHEMISTRY Second Level Review

OC Batch Number: 7033225 W05098

A. Sample Analysis	Yes (√)		1 101/10 (5/13)
T Am Alama T transcript		No (√)	N/A (1)
1. Are the sample yields within acceptance criteria?			
2. Is the sample Minimum Detectable Activity < the Contract		<del> </del>	
Detection Limit?			.
3. Are the correct isotopes reported?		<del>                                     </del>	
B. QC Samples	1		
1. Is the Minimum Detectable Activity for the blank result ≤ the			
Contract Detection Limit?		1	
2. Does the blank result meet the Contract criteria?			
3. Is the blank result < the Contract Detection Limit?			
4. Is the blank result > the Contract Detection Limit but the sample			
result < the Contract Detection Limit?			
5. Is the LCS recovery with contract acceptance criteria?			+
7. Is the LCS Minimum Detectable Activity ≤ the Contract Detection	1		
Limit?			
8. Do the MS/MSD results and yields meet acceptance criteria?			
9. Do the duplicate sample results and yields meet acceptance	-	-	
criteria?			
C. Other	-	+	<del>-   </del>
1. Are all Nonconformances included and noted?			
2. Are all required forms filled out?			
3. Was the correct methodology used?	-		
4. Was transcription checked?			
5. Were all calculations checked at a minimum frequency?		<u> </u>	<del>-</del>
6. Were units checked?	<del>                                     </del>	<del> </del>	
Comments on any "No" response:			
			•
		,	
	* *		
Second Level Review Retry Cally			

PNNL John Collector FLUOR	919014 W05V98	5-0	7		CHAI	N OF	CUSTODY	SAMPLE AN	NALYSIS R	REQUEST	•	C.O.C. #	106-05		
Collector FLUOR	HANFORD		<u>/l</u>			Contact/Re	guester		***************************************	Telephone No.	MSI		FAX	1	
37171	R. WEIL					Dot Stew	art			509-376-5056			. 7 1 7 1		
SAF No. 106-054						Sampling C Hanford				Purchase Order/	Charge Code				
Project Title						1		, 2		Ice Chest No.	· - i /	Temp.			
2UP1-LOL AUG							F-10-50	0 7							
Shinned To (Lab) Severn Trent Inc.		hland				Method of Govt. Ve				Bill of Lading/Ai	ir Bill No.				
Protocol SURV			90 May 1	No.				ority: 45 Days		Offsite Property	No.			,	
POSSIBLE SAMP  ** ** Contains Rac releasable per DOE Or	lioactive Materi	al at co	ncentrations that	are not regul	ated for transp	ortation per 49	CFR but are not	SPECIAL INSTRUC Batch all PNNL GW sar 14 days. Submit invoices & delive	nples submitted under "				otion: Yes ⊻ to exceed SDG		
Sample No.	Lab ID	*	Date	Time	No/Type Container			· s	ample Analysis				Preservativ	e	
B1K561		W.	1-18-06	1125	1x20-ml	_ P	Activity Scan	None							
B1K561		W	1	1	1x500-n	nL G/P	UTOT_KPA: Ura	nium (1)			HNO3 to pH <2			******	
B1K561		W			2x4000-	mL G/P	I129LL_SEP_LE					None			
B1K561		W		Ĺ	1x500-n	nL P	TC99_ETVDSK_	LSC: Tc-99 (1)			HCl to pH <2				
									I M3TT	-					
			<b></b>												
Ĺ	1	<u></u>	<u> L</u>		<u> </u>		<u> </u>				<u> </u>				
Relinquished By FLUOR HANFO M.R. WEIL Relinquished By	Print	M	Sign		Date.  Date.	Time / 4. / 8 2007	Received By Received By	th S. Sm	Sign Vh	Date/Time / JAN 1 8 21 Date/Time	SE = SO =	Soil Sediment Solid Sludge	DI. =	= Drum Se = Drum L = Tissue = Wine	
Relinquished By					Date	Time	Received By			Date/Time	W =	Water	1, =	Liquid Vegetat	

FINAL SAMPLE Disposal Method (e.g., Return to customer, per lab procedure, used in process)
DISPOSITION

Date/Time

Received By

Relinquished By

Disposed By

Date/Time

X = Other

A = Air

Date/Time

# TI STL

# Sample Check-in List

Client	Pow	SDG #: WO	5093 NACT	SAEH. A	106-054 NA (
Work	Order Number: <u>J</u>	7A190144	Chain of Custoc		
		. /			
1.	Custody Seals c	n shipping container inta			
2.	Custody Seals d	ated and signed?			Yes No[]
3.	Chain of Custoc	y record present?			
4.	Cooler températ	ure:NAJ	5. Vermiculite/pack	nu moterio	Yes [ No [ ]
6.	Number of samp	ples in shipping container	:	ng marcha	is is NA 🖊 Wei ( ) Dr
7.		times exceeded?			Vanish
8.	Samples have:tapecustody se	ola.	h	azard label	Yes[] No[]
9.	Samples are:in good cobroken		le	aking. aye air bub	samples labels  bles requiring head space)
10.	Sample pH taker	? NA[] pH	<2 // pH>2 //		
	Sample Location *For documentat	, Sample Collector Listed ion only. No corrective a	? * ction needed.		Yes No[]
12.	Were any anoma.	lies identified in sample r	eceipt?		Yes[] Nox
13.	Description of an	omalies (include sample)	numbers):	<ul> <li>In a part of a montain on a variable of the part of t</li></ul>	
~~~~	Custodian:	S. Sm. Ve	Date: 07	-18-0	7 14:10
Clie	nt Sample ID	Analysis Requested	Condition		Comments/Action
lient Inf	ormed on	by	Person co	ntacted	
] No a	ction necessary; pro	cess as is.		Sent a service de prop	and the Communication of Security Security Security Security (Security Security Security Security Security Sec
roject M	anager		Date		
S-023, 9.	/03, Rev. 5	· · · · · · · · · · · · · · · · · · ·	The second secon	A personal distance of the second distance of	

PNNL	J1A220122	
	W05098	
	Due 03.05.07	

C.O.C.#

E I VI VEZ	W050	98	'		CHA	N OF	CUSTODY	/SA	MPLE ANALYSIS	<b>REQUEST</b>	<b>٦</b>		.06-054	-134
Du	W050	05.	07									Page	<u>1</u> of	1
Collector	Fluor E M		orci	· · · · · · · · · · · · · · · · · · ·		Contact/Re				Telephone No. 509-376-5056	MS		АX	
SAF No.						Sampling (	Origin			Purchase Order				
106-054 Project Title						Hanford	HNF-N-	5	162	Ice Chest No	?C-ES-66	Temp.		
2UP1-LOL AUG Shinned To (Lab)	UST 2006					Method of				Bill of Lading/A		<i>f</i>		
Severn Trent Inc Protocol	ornorated Ric	hland				Govt. Ve				Offsite Property	· No			
SURV POSSIBLE SAMP	AT WY WILL OF A TOP	NC (ID) II	DE A DIZO			<u> </u>	Pri	<del></del>	: 45 Days				77 .0	
** ** Contains Rac releasable per DOE Or	dioactive Materia	al at co	ncentrations that	are not regulat	ted for transp	oortation per 49	CFR but are not	Ba 14	ECIAL INSTRUCTIONS In the fall PNNL GW samples submitted undays. binit invoices & deliverables to DL Stew		Total Ac	ctivity Exempti one SDG, not to	on: Yes 💌 exceed SDG cl	NO Losure of
Sample No.	Lab ID	*	Date	Time	No/Type	e Container			Sample Analysis		· · · · · · · · · · · · · · · · · · ·		Preservative	
B1K5C9		W	1-19-07	0907	1x20-ml	L P	Activity Scan				None		***************************************	
B1K5C9		W	1-19-07	0907	1x500-n	nL G/P	UTOT_KPA: Urai	nium	(1)		HNO3 to pH <	2		
		<del> </del>		ļ	ļ				JM6GL					
	-	╂			<b> </b>									
	<b>1</b>	<del> </del>						*** *** · · ·				Tradition are as a second		
		<b>†</b>			<u> </u>			·········· ×··························		,				
													· · · · · · · · · · · · · · · · · · ·	
						M								
		<u> </u>												
	-	<u> </u>							1.11.11.11.11.11.11.11.11.11.11.11.11.1					
		<u> </u>												
	-	-		<u> </u>	<u> </u>									
<u> </u>	<u> </u>	<u> </u>	<u></u>	<u> </u>	<u> </u>	·					<u> </u>			
Relinquished By Fit	Print		509	9	Date	Time / 35	Received By		Print Sign	Date/Time	1350	Ma	atrix *	
	M. HALL			CAN '	9 200		ERIZ DAG	2 lo =	· IN	Date/Time	97 s	= Soil		Drum Solid
Relinquished By	U	<del>/k</del>				/Time	Received By	<u> </u>	) 2 3	Date/Time	SE SO SL	= Sediment = Solid = Sludge = Water	DI. = T = WI =	Drum Liqui Tissue Wine Liquid
Relinquished By					Date	/Time	Received By			Date/Time	0	= Oil = Air	V =	Vegetation Other
Relinquished By	MALESTER				Date	/Time	Received By			Date/Time				
FINAL SAMPL DISPOSITION		Method	l (e.g., Return to	customer, per	lab procedur	re, used in proc	ess)	·····	Disposed By			Date/Ti	me	

# TI STL

Sample Check in List

Cli	ent: PNL	1/19/07 1350 SDG#:W	05098 NA [] SAF# IC	<i>f</i>
Wo	ork Order Number:	T7A220122	Chair of Court in SAF# 16	054 NATI
Shi	pping Container ID:		The second secon	
1.		on shipping container into	Air Bill #	
2.		dated and signed?	MA ( )	Yes [of No []
3.		dy record present?	NA[]	Yes (+No ()
4.				Yes [] No[]
6.	Cooler tempera	ture:NA D	5. Vermiculite/packing materials	is NA [a] Well I have
		m ampping container		To Hole, Diye
7. 8.	Samples have:	times exceeded?	NA W	'es[] No[]
9.	tape		hazard labels appropriate sar	aples labels
10.	Samples are:in good cobroken Sample pH taken		leaking. have air bubble (Only for samples req	s uiring head space)
11.	Sample Location	Sample Collector Listed ion only. No corrective ac	2 () pH>2 () pH>9 ()	(es [No[]
2.		ies identified in sample re		- 67 (10 ( )
3.	Description of and	omalies (include sample n	umbers):	es[] No[]
	Custodian:	a Daby	Sm 44 1/19/07	
CIII	ent Sample ID	Analysis Requested	Condition	Comments/Action
ient In	formed on	by	Person contacted	
) No e	action necessary; proc	ess as is.	on total (CC)	